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JULY, 1904

# The American X-Ray Journal

A JOURNAL OF  
Progressive Therapeutics

*Electrical Science*

*X-Ray Photography*

*Electro Therapy*

*Radio Therapy*

*Photo Therapy*

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Official Organ of The American Electro Medical Society

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PROF. W. E. GOLDSBOROUGH

Chief of Department of Electricity, Universal Exposition of St. Louis, 1904

# THE AMERICAN X-RAY JOURNAL

Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. XV.

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No. 1

## A Cell Tonic Adjuvant in X-Ray Therapy.\*

BY HAMILTON FORLINE, M. D., CHICAGO.

During the last few years much has been written on the subject of x-ray in the matter of its application to the relief of many pathological states hitherto more or less, if not entirely, resistant to known methods of treatment. Much credit has been given it by enthusiasts which probably it does not deserve, and without doubt there remains much of value to be revealed by the many tireless and conservative men now engaged in an earnest endeavor to define its exact place as a therapeutic agent. With this, as with all new remedies, some of us are prone to assign to it virtues not possessed, by drawing conclusions based upon evidence which greater experience will show to be erroneous. Without presuming to criticise the claims made for the x-ray or attempting to inform this learned body of its apparent manifold merits, I wish to dignify the remedy by briefly discussing the probable value of adjunctive agents in some of its fields of usefulness.

That the x-ray possesses an unmistakable power to modify certain cell metamorphoses is believed when we study the clinical evidence at hand. If we are to admit the truth of the many reports of physicians in America and Europe chronicling the dissipation of malignant neoplasms, the cure of certain forms of tuberculosis and other microbial diseases, superficial and deep, the removal of hair, cuticle, and the performance of many other interesting

therapeutic feats, we become at once impressed with the immense possibilities of this comparatively new principle in therapy. It does not follow, however, that such results as are claimed for the remedy may be best acquired unaided. Further research and more accurate observation will lead to the discovery of many essential accessories, but none in our present knowledge appeals to me with greater force than the cell tonic adjuvant, particularly in the x-ray treatment of malignant growths. It would seem, if the present theory of the action of the x-ray in malignant disease is correct, namely that it changes the position of the ions, breaking up, so to speak, the existing bacterial or cellular arrangement of the growth, thus rendering it highly important that the individual integrity of the normal cells should be sustained in every possible way—that a cell tonic of great potency is imperatively indicated.

Without discussing further the x-ray's specific action, I will call your attention to some data relative to an adjuvant, which, in my judgment, is of great usefulness. Of the various cell tonics included in our armamentarium which have been used in this particular field, greatest preference has been given to the tonic principles derived from normal animal fluids and cells, because in this instance they are more easily decomposed into their consti-

\*A paper read before the American Electro-Medical Society,

tuent elements by the x-ray and thus act more efficiently. Thus nuclein, protonuclein and spermin phosphate have been selected and proven serviceable.

Four years of careful and extensive use of a powerful direct cell tonic composed of pure animal lymph, orchitic fluid and blood serum, furnishes me with material which I believe justifies me in drawing conclusions relative to its value. The opportunity has been mine to observe its action in a great variety of chronic diseases and I am convinced that it is by far the most powerful cell tonic now in use.

To exemplify the degree of its cell tonic effects I shall cite, briefly, a few commonly obtained results in chronic infections and degenerative diseases.

CASE 1.—Male, age twenty-four, family history negative; had pneumonia four years ago which left him with a persistent cough. Examination revealed a very severe and extensive infiltration of both lungs, principally the right. He was markedly emaciated. Several small cavities in both lungs in and below apices. Profuse purulent expectoration, teeming with tubercle and pyogenic micro-organisms. Temperature on admission 104°. Heart faintly degenerated and markedly asthenic. Blood count three million r. b.c. to the c. m.; percentage hemoglobin sixty-five. Case was of a rapidly progressive type. Results of treatment in thirty-three days: Temperature, 98.6; cough greatly lessened; expectoration diminished and changed to mucus; gain of fifteen pounds in weight; night sweats entirely absent. Examination of sputum shows very few tubercle bacilli.

This case illustrates very well the powerful cell tonic action of the treatment, as it had only been used thirty-three days and was given during the worst part of the winter season of the present year, the season during which Chicago has had her

greatest mortality in pneumonia and other lung diseases.

A case of tropical dysentery in a man thirty-three years of age, treated by me three years ago, who with five friends had drunk some water in a semi-tropical country, soon after which they were all attacked with an entero-colitis of a very severe character. His five friends all died of the trouble. On admitting this case his condition was as follows: Severe catarrhal inflammation, with extensive ulceration of the large and small intestines; microscope revealed the presence of the amoeba coli in the discharges, together with the bacillus coli communis and pyogenic microbes. He had lost about forty pounds in weight, was very anemic, had a nearly constant temperature of 101 to 102, rapid pulse, presence of blood and large quantities of mucus in stools, increased quantity of urine with high specific gravity and a trace of sugar. A clear case of tropical dysentery in which treatment is rarely successful.

This case was given fifteen minimis of the lymph-orchitic fluid compound twice daily, and a suitable diet. We persisted in the treatment three times daily for about three months, giving simple stomachics and mild cathartics when indicated. The patient was practically cured. Gastro-intestinal symptoms almost entirely disappeared, he gained about twenty pounds in weight and other symptoms were removed.

A letter from this patient a month after he was discharged states that he still continues to improve in every way.

Being fearful of tiring you with a long list of results, which I could recite indefinitely, I wish in conclusion of this part of the subject under consideration simply to add results in general and the recitation of a single case in a typical degenerative disease, namely, locomotor ataxia.

In locomotor ataxia I have succeeded with this remedy as a basic treatment, and purely as a result of its cell tonic properties, in 75 per cent of cases treated (which have been a large number) in relieving pain, decidedly lessening the ataxia, restoring sphincter control when lost in not too advanced stages, and in apparently stopping further progress of the degeneration. I do not wish it to be understood that I vaunt this agent as a cure for locomotor ataxia, but I believe it to be by far the most valuable treatment we have for this disease at the present time.

The case I shall report is representative of a result obtained in decidedly a minority of cases and is one of the few in which I think I am justified in stating that a practical cure has resulted.

Man, age thirty-seven, specific history. Disease began ten years ago, with lightning pains which were diagnosed and treated as rheumatic. Five years later he began to note impairment in gait with a development of anesthetic zones in back and legs below the knees, cushioned feet, the girdle sensation, vesical incontinence and rectal sphincter weakness. At the time of examination incoördination was marked being unable to stand alone. A-R pupil present. There was also a definite arterial thickening. In thirty days after he began treatment, by the supra-dural method combined with subcutaneous injections, the pains were very much diminished, gait and other symptoms seemingly not affected. At the end of sixty days incoördination was slightly improved, pains still less, and he had better control of bladder and rectum.

The patient was treated ten months, at the end of which time he was discharged, with gait practically normal, pains entirely absent, perfect bladder and rectal control. In fact, he was in a condition

such as to render it impossible to detect, except by closest physical examination, any evidence of the disease.

Such results as the above have been accomplished not only in my own work, but have been reported by hosts of physicians all over this country. For the benefit of those not conversant with the formula, etc., of this cell tonic referred to, I will briefly state that it is for hypodermic use only, is a sedimentary fluid—the sediment being composed of intact lymph cells and spermatozoa. It is composed of pure unfiltered lymph obtained from fresh lymph glands and ducts combined with concentrated orchitic fluid, preserved in a menstruum composed of carbon water and blood serum, to which is added a small quantity of chloride of gold and sodium. Notwithstanding the sediment of intact cells, the remedy when injected produces no reaction or local irritation, it often having been injected to the dura-mater (spinal and cerebral), as well as into the subarachnoidean space and peritoneum, in none of which situations has it produced the slightest evidence of harmful reaction, either immediate or remote.

At the present time I am injecting the fluid directly into the body of cancerous growths, with apparently no local reaction of a deleterious nature. It seems, in the light of our experience so far, with the combined x-ray and cell tonic treatment, that a valuable addition to methods has been instituted. The following case reported to the local society in January this year is interesting in this connection:

A man fifty-five years of age had been suffering from a small-celled sarcoma of the ocular cavity; he had been submitted to all forms of treatment for this condition for a period of twelve years without any benefit. One year ago he was given treatment by the x-ray for this condition

and continued it ten months without any change. At the end of ten months we started in with ten-drop doses twice daily of this Lymph-Compound, and at the end of sixty days of treatment the inflammatory area was much diminished, an active healing process was noted and this improvement continued until there were evidences of a perfect recovery.

This case is particularly instructive, as the x-ray, with many other forms of approved treatment, had been faithfully applied without any change whatever in the character or condition of the growth, and not until the administration of the cell

tonic did we get any results.

In conclusion I have no apologies to make for dwelling upon a remedy which has here and there met with some adverse criticism from a few medical men who were not accurately informed regarding its true character, because the clinical evidence accumulated during the last six years has given it a standing which is bound to meet with universal recognition. No doubt there are many other adjunctive measures to be considered in this connection, but I shall leave their discussion to those better informed in their relative values.

## Psycho Therapy.

BY SHELDON LEAVITT, M. D.

"Don't get into such a narrow channel, be broadminded and willing to prove all things, and hold fast to that which is good. All wisdom does not reside in allopathy, homeopathy, osteopathy, electrotherapy, or any one of the pathies, but there is a semblance of good in all of them."—Dr. J. R. Etter.

The man of science should not think for a moment that he has reached finality in the study of phenomena, and usually he does not. At the same time it is wholesome to be reminded of our shortcomings. An ancient monarch commissioned a dependent to solemnly caution him every morning with the declaration that he was mortal.

### BEYOND THE ATOMS.

While the following suggestions are commonplace, they are in an impressive setting, and, for this reason, are worth reading. There is little new under the sun; it is the unconventional way of putting truths that gives them their freshness.

Not long ago an atom was the smallest known division of matter; but now we

have electrons, the constituents of atoms, which make an atom itself look like a miniature universe.

And the electrons: what are they? Who can yet say? They are expressions of energy; and so is thought; and so is everything, whether visible and invisible. We have need to beware how we establish limitations—both for ourselves and other potentialities.

When an electrical charge is passed through a Crookes tube, one sees a beautiful velvety greenish glow inside the tube. This is due to the incandescence of tiny fragments of matter traveling at an incredible speed.

They are electrically charged corpuscles named electrons. The electrons make up or compose the atoms of matter. Atoms are small things—very small; three hundred millions of atoms placed in a row would not measure quite an inch. A granule of starch would equal in size a trillion atoms. An atom is an aggregation of electrified corpuscles—electrons. Electrons are very small, probably a thousand million times in bulk smaller than an atom. An electron, for size, may be compared to atoms as a dust mote to a good-sized church edifice.

Clusters of those electrified corpuscles (electrons) build up the different kinds of matter, the "elements" of the chemist. They are the stuff of which all existing things, man, monkeys, sticks, stones and worlds are made.

EFFECT OF ANESTHETICS ON X-RAY PHENOMENA.

M. Jean Bacquerel, a French investigator, has found that the n-rays emitted by animals are checked when the latter are put under the influence of chloroform. When the effect of the anesthetic has passed, the emission of the rays begins again.

Continuing, he found that flowers, which usually sent out the rays, when chloroformed, also went to sleep, and ceased to give them out; and even inanimate and inorganic substances responded in the same way, stopping the emission when under the influence of chloroform, and beginning it again when the effect might be supposed to have worn off. In short, it seems that anesthetics actually send to sleep metals and flowers, as well as animals.

This throws some light on the phenomena of sleep which has appeared to be little else than an inhibition of so-called consciousness. It is more and more evident that our knowledge of the essential nature and prevalence of mind is but fragmentary. Let both materialists and non-materialists tread softly.

DO THOSE WHO INHERIT QUALITIES MERELY REMEMBER THEM?

A German writer maintains that memory is a universal function of organic matter and that heredity is merely one phase of it. Memory is often conscious, but not always so. When unconscious, it results in automatic or reflex acts. When the eyelid closes before a threatened blow, the action may be regarded as the result of unconscious memory. Such instinctive action occurs even where there is no real nervous tissue, as in the lower organisms, and in plants. The turning of a sunflower toward the light may be looked upon as an act of unconscious memory. Between this kind of memory and heredity we can

not draw the line. According to the new theory the reappearance of a parent's qualities in the offspring is due to the re-production of experiences undergone by the germ while still an organic part of the parent's body—in other words, to the "remembrance" of these experiences. "Every living being of today," in the words of an exponent of this theory, "is the product of the unconscious memory of organized matter."

This is a view of heredity that appears to be most rational and intelligible, and one that makes our tendencies more controllable. Psychologists have long maintained that reiterated auto-suggestion is capable of breaking the power of hereditary influences and of turning vital energy into new mental and physical channels. The foregoing hypothesis, then, concerning the nature of heredity gives us stable theoretical grounds for certain claims of psycho-therapy. The memory of what has usually been done can surely be shorn of its power as a determiner of subconscious action, if only the purpose be adequately strenuous and persistent.

THE DUAL NATURE OF DISEASE.

"The truth remains that no disease is purely mental, any more than any disease is purely physical. Hence material and mental remedies, not only empirically, but scientifically, go well together."—"The Personality of the Physician."

Up to the present moment there has been a manifest disposition of the greater part of the profession to look upon nearly all physical ailments as purely physical, and accordingly as demanding only physical remedies. A constantly increasing number of observers, both professional and lay, have thought otherwise, believing that the springs of disease lie in the realm responsive to neither chemical nor microscopic research. More than a century and a half ago that greatest philosopher of re-

cent centuries, Immanuel Kant, declared that "Time and space have no existence apart from mind. There is no such thing as sound (the sensation) unless there be an ear to receive the vibrations. Things and places, matter and substance, come under the same law, and exist only as mind creates them."

The same philosopher, possessing a feeble constitution, himself just five feet tall, with a slender body and mammoth head, at a time when assured that there was little to hope for from physical sources, nightly wrapped himself up in the bedclothes and resolutely exclaimed to himself, "How comfortable I am! How comfortable I am!" And what was the effect? Could a man grow worse under such treatment? He grew strong and well, maintaining his health till the last few months of his life, which extended to the eightieth year.

Latterly the profession, with noticeable unanimity, have come to admit that some diseases are partly mental in origin, but they have endeavored to restrict the list to those of a distinctly nervous type. Few

are willing to admit that disease of an organic nature, presenting objective pathological features, such as carcinoma, fibroma, tuberculosis, etc., have distinct roots running deeply into the substratum of mind.

A determining factor of importance in the ordinary opinion concerning the etiology of disease lies in the common supposition that mind is wholly represented in consciousness. It is presumed that what the mind does not sense has no existence: that one has no unconscious phases of mental activity, all phenomena of seeming intelligent and purposive action, not springing from conscious mind, being referable to sensory-motor reflexes.

It is the mission of the New Psychology to broaden the view concerning disease etiology so as to include as prominent factors in the production of morbid phenomena, subconscious, or unconscious, mental concepts.

The medical profession has to learn that by far the greater part of mind lies below the threshold of consciousness and that into this part of mind are traceable the rootlets of *all* forms of disease.

## Recent Advances in X-Ray and Electro Therapeutics.\*

BY ELMORE S. PETTYJOHN, M. D., AND T. PROCTOR HALL, PH. D., M. D.

In the autumn of 1895 Professor Roentgen discovered the x-rays. At that period electro-therapeutics was condemned by the great majority of physicians. This condemnation was the result of prejudice, it is true, but was a not unnatural consequence of the fact that most of those who undertook to use electricity were extremely ignorant and exploited the most fantastic absurdities. These were the fools that rushed in where angels feared to tread, until by and bye the path became so well beaten that even angels were not afraid to walk there.

The physicians knew also that they themselves (the angels) knew nothing of electricity and shrank from attempting to use an agent which seemed so utterly capricious and unbridled in its effects.

A few years ago it was not uncommon to hear expressions of intense animosity against electro-therapeutics from well informed physicians. It was called a *fake* and was to be avoided by any self respecting doctor. Such expressions are no longer a sign of prejudice, but only of ignorance, and this ignorance is rapidly giving away before the light of scientific research.

\*Read before the American Electro Medical Society at Chicago.

Electricity had been used more or less for ages in the treatment of disease, mostly by men who did not profess to be physicians. After the discovery of the voltaic pile, a little more than a hundred years ago, many physicians experimented with this form of energy. There were some successes and innumerable failures. Even after the chemical and physiological properties of the electric current had been carefully investigated, this knowledge remained in the hands of a very few, and most of the experiments in electro-therapeutics continued to be made by men who knew next to nothing of electricity and still less of therapeutics. This sort of thing continued, with variations, up to the close of the last century.

In the year 1895 most of the static machines were small and were possessed by men who knew little or nothing of their therapeutic uses. As soon as it was found that these could be used to furnish the current for an x-ray tube, the demand for static machines became very much greater. Manufacturers vied with each other in producing better and cheaper machines which they advertised widely, calling attention to their value for electro-therapeutic purposes as well as for producing x-rays. This more than any other feature has led to a much more extended use of electricity in therapeutics during recent years. It is still unfortunately true that four-fifths of the physicians who own electric machines know next to nothing about their therapeutic uses, but there is and has been for several years a rapidly growing interest in electro-therapeutics. The science itself is becoming more clearly defined and is attracting the attention of some of our best educated men, so that today the physiologic and therapeutic properties of the various forms of electricity are as well known as those of any drug in common use. To make this knowledge

common to the great body of the medical profession will require time.

In the application of the galvanic current there has been little that is new during recent years. Methods which were used long ago, and which were abandoned by many physicians and surgeons as worthless, because these physicians and surgeons did not know enough about electricity to use the methods intelligently, are now coming into more general use.

The invention of improved apparatus has greatly facilitated the wider use of electro-therapeutics.

Finsen's experiments in the cure of lupus and other diseases by light gave a great stimulus to investigation in both radio-therapy and photo-therapy.

At the present time electro-therapeutics has passed its babyhood and is a strong and lusty youth. Its constitution is well established and it is making its way on its own merits without asking any favors. In the mechanical arts a greater variety of effects may be produced by means of electricity than by any other single agent. The same is already true of electricity in medicine. There is no other single agent by which so many different abnormal conditions may be overcome by one who understands this force.

It may be in order now to briefly outline these effects. The positive electrode, or anode, produces acids, which are astringent and constrict the smaller blood vessels, thus diminishing the blood supply to that part. This electrode can be used to reduce inflammation in the acute stage, whether of nerves, muscles or other tissues. When the current is concentrated at the anode it coagulates the albuminoids and produces a hard scar. The anode also oxidizes the tissues, and can be used for reducing excessive muscular excitability such as is found in chorea.

The negative electrode, or kathode, is the direct opposite of the anode in all its effects. It is alkaline, softens and hydrates the tissues, and increases the blood supply. It can be used for increasing the nutrition of any desired part. The alkali has also the power of softening dense connective tissues so that, by its continued use in moderate degree, strictures and other forms of scar tissue can be removed without pain or danger. Abnormal growths in the epithelial or connective tissues may be dissolved by the needle kathode. By the application of the same direct or galvanic currents, using the anode or the kathode as may be required, medicaments can be carried into the body from the surface. This process is known as kataphoresis. The medicaments are not, as is sometimes taught, carried bodily thru the skin; but, as in all cases of electrolysis, are broken into ions of which one set, the kations, which are the metallic, basic, or alkaline parts of the molecules, move downward toward the kathode; while the other set, the anions, which are the acid parts of the molecule, move up stream toward the anode.

The alternating current, of which the faradic is a crude example, shakes up the elementary constituents of the cells and stimulates metabolic changes. It can be used to advantage in all cases in which the tissue changes are defective. Of course elimination must be carefully looked after at the same time, else poison may accumulate in the blood, and the last stage of that man may be worse than the first. High frequency currents and so-called wave currents are varieties of the alternating current and produce similar effects.

Coming now to the x-ray itself we find that, beginning with its first therapeutic application by Dr. H. Preston Pratt, of

Chicago, in April, 1896, there has been a fairly steady advance up to the present. The first stages were slow. People in general and physicians in particular were slow to believe that there was any therapeutic value in the silent and invisible rays from a Crookes tube. For several years it was the fashion to ridicule or denounce the claims of those who were experimenting with the x-rays. But the successes were so marvellous that they commanded the attention of the public, and the public were so insistent that physicians were compelled to give some attention to the x-ray therapeutics. The most brilliant result in x-ray therapeutics is the cure of numerous cases of malignant diseases which have defied every other form of treatment. Sarcomas under its benign influence gradually melt away and disappear. In fact, if there is such a thing as a specific for an abnormal condition we are reasonably safe in making the statement that the x-ray is a specific for sarcoma. Carcinomas are not so rapidly overcome by the x-ray, but in the hands of experts it is exceedingly rare to find one at or near the surface of the body which can not be destroyed by this means. Carcinomas in the interior of the body are difficult to reach effectively by x-rays, both because the x-ray tube is necessarily further from the tumor, and because of absorption of a considerable portion of the x-radiance by the intervening tissues.

The x-ray increases metabolic changes, acting in this respect in the same way as the alternating current and waves of light. But the x-rays have the advantage in being able to penetrate any kind of tissue and thus may be made to reach and act upon any desired portion of the body. By their combined powers of metabolic acceleration and irritation they are able to cause the solution and absorption of a con-

siderable number of abnormal deposits, as for example fibrous adhesions after inflammatory conditions in or about a joint. Many kinds of infections are quickly overcome with the aid of the x-ray. Tuberculosis in all its forms, both internal and external, except in very advanced stages, is amenable to x-ray treatment when supplemented by other ordinary therapeutic measures.

While during the last two or three years nothing particularly new or startling has been announced in x-ray therapeutics there has been during this time a rapid and steady improvement in technic. Numerous failures in x-ray treatment have been reported, but in most of these cases in which the reports have been made with sufficient fullness of detail an expert can see in the mode of treatment itself good reasons for failure. It is not to be expected that a method which requires an

expert knowledge of electricity as well as of electro-therapeutics can be taken up at once without instruction and successfully used by the average physician. Besides the difficulties inherent in this form of treatment, we have to contend with a more or less widespread notion that any form of electrical treatment ought in some magic way to effect a cure by itself. When using electricity a physician frequently neglects the plainest indications for the use of drugs, or other remedial agents. The days of cure-alls have surely long gone by for physicians, and the electricity can and does advantageously displace many of the older forms of treatment it ought to be used only in those cases in which its effects are desirable. When so used, intelligently and in combination with such other means as may be required, it is without doubt the most valuable therapeutic agent in our armamentarium.

### Extraordinary Phenomena of N-Rays.

The latest of the various types of radiations discovered and studied during recent years—namely, the n-rays and the n'-rays—have developed most peculiar properties, some of which perhaps are capable of being utilized for practical purposes. Thus it has been found that certain chemical reactions are always accompanied by the emission of n-rays, while in other reactions, which from a chemical point of view are very similar, no n-rays appear. There appears to be no parallelism whatever between the process activity of the chemical reaction and the n-ray effect, and for this reason a study of the emission of n-rays might enable one to recognize the existence of a certain reaction otherwise masked. Some very interesting biological effects have recently been studied by several French savants with reference more particularly to the variation in the

emission of n-rays from the brain of an animal while under narcosis, and to analogous experiments with inanimate substances, like metals. For example, M. Edouard Meyer has found that plants cease emitting n-rays when subjected to the influence of chloroform; and M. Jean Becquerel later found that the same effect may be observed with inorganic sources of n-rays, like calcium sulfid, which, when exposed to vapors of chloroform or ether, cease entirely to emit n-rays.

The question having presented itself, What would be the effect on the nerve centers of animals under the influence of anesthetics? some experiments along this line were made by MM. Jean Becquerel and André Broca and reported to the French Academy of Sciences on May 24. They subjected dogs to the action of vapors of ether and chloroform and studied the

emission of n-rays from the brain substance and from the spinal marrow during the several stages of the experiment. The different narcotic substances have somewhat different effects in detail, but in general the effect is as follows: In the state of high excitement which precedes the stage of narcosis, the brain emits n-rays in enormous quantities. They may be easily observed by means of the decreasing brightness of a calcium sulfid screen, fixed at the end of a lead tube and passed over the brain fissure. When the subject reaches the real stage of narcosis, the phenomena change, the brain no longer emits n-rays and later on n<sup>1</sup>-rays appear. The latter are recognized from the fact that the brightness of the sensitive screen, when handled in the same way as before, now increases. It was found that the radiation from the spinal marrow undergoes much smaller variations than that from the brain. The spinal marrow can be studied with great ease on account of the centers of radioactivity existing in it, as located recently by Broca and Zimmern. Here the changes in the emission of n-rays are small, and even after respiration and the activity of the heart have ceased, the rays continue to be emitted from the spinal marrow for about half an hour. The absolute cessation of radiation from the nerve centers for several minutes is a sure sign of death.

In a later note presented by M. Jean Becquerel to the French Academy, other and still more singular observations are recorded. Aluminum and copper are transparent to n-rays, but this transparency ceases as soon as the surface of the metals is subjected to the action of anesthetics. On the other hand, glass and wood continue to let the rays pass. Moreover, a metal emitting rays from its total mass, like steel or copper in compressed or elongated condition, ceases emitting

rays if its surface is subjected to the influence of anesthetics, while compressed wood does not seem sensible to the action of chloroform or ether. All these facts emphasize the great complexity of the phenomena. Whether, however, the results observed are due to the anesthetic properties of the liquids used, or to other properties they possess, the report referred to leaves us in doubt. Before it can be safely assumed that inanimate substances are affected by anesthetics as such, very positive proof will have to be presented. M. Becquerel has attempted to analyze the nature of the molecular vibrations to which he attributed the origin of n-rays and n<sup>1</sup>-rays. He distinguishes two different vibrations: First, undulations like those of light waves, which pass through aluminum with a speed comparable with that of light through glass; second, another form of energy which passes through aluminum very slowly and the transmission of which may be arrested at the surface of metals under the influence of anesthetics.

Further investigation of these extraordinary phenomena will be awaited with interest. The history of the development of our knowledge of radiations is most interesting and peculiar in several respects. It is peculiar that the different kinds of radiation, some of which we now know to be nearly everywhere present, have been overlooked until quite recently, and their intimate study appears likely to remove some of the distinctions between different branches of science, while practical applications of their properties have already been made. We know, for example, that Röntgen rays are useful in medicine and surgery, and radioactivity has recently been applied to the measurement of capacities. Moreover, nothing has contributed more to the development of the electron hypothesis than the study of cathodic

rays, and it is not improbable that further investigation will furnish material for a wholly new foundation for the sciences of physics and chemistry. Even more interesting is that, in view of the results from the study of n-rays, we may at least hope that bridging the gap between animate and inanimate nature will not forever remain a mere dream of the speculative mind.—*Electrical World and Engineer.*

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**N-Rays.**—Bichat gives an account of experiments made to find an explanation for the apparent anomaly that n-rays, being a form of radiation, may be "conducted" by a wire. The conduction is a case of successive reflection. Light may be similarly conducted along a curved glass tube. The transmission is really due to the wire and not to the medium in which it is placed. In order that the conduction may take place, it is necessary that the material of the wire should itself transmit n-rays.—*Comptes Rendus*, February 8.

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**N-Rays.**—Bichat has observed some properties of n-ray emission which show a strict analogy to phosphorescence. Meyer has made further experiments confirming Becquerel's observation that there is a true action of anesthetics, such as chloroform, upon the emission of n<sup>1</sup>-rays. J. Becquerel has found that in all cases where a surface emits n-rays normally, it emits

n<sup>1</sup>-rays tangentially and vice versa. This fact establishes a close correspondence between the emission and absorption of these rays which leads him to some generalizations. A brick exposed to the sun emits n-rays normally and n<sup>1</sup>-rays tangentially. A patch or cross of the phosphorescent sulfid alternately brightens and darkens as successive surfaces of the brick are exposed to it. When a body is compressed, it emits n-rays from the compressed surface and n<sup>1</sup>-rays from the surfaces perpendicular to it. The author lays down the following general rules: The rays produced by the compression of a body (n-rays) have the property of increasing the sensibility of vision, and produce, on a surface capable of storing them, the same effect as regards radiation as does a compression normal to that surface. The rays produced by the stretching of a body (n<sup>1</sup>-rays) have the property of diminishing the sensibility of vision, and produce on a surface capable of storing them the same effect as a tension normal to that surface. The author seeks the origin of the rays in the vibrations of the molecules attaining a new position of equilibrium. In looking for some regularity in the spectrum of the rays, he found that Blondlot's values may be arranged in two series, one of them containing multiples of 2.9  $\mu\mu$ , the other containing simple fractional multiples of 4.9  $\mu\mu$ .—*Comptes Rendus*, May 30; (*Elec. World and Eng.*).

## 7

### Electricity in Diseases of the Throat.

BY H. L. LEWIS, M. D., CHICAGO.

Electricity as an adjunct in the treatment of diseases of the throat is practically limited to galvanism and faradism, applied either internally directly to the membranes of the larynx by a laryngeal electrode or externally to the neck by the ordinary flat sponge electrode.

The application of either the positive or negative electrode directly to the vocal cords in some forms of paralysis is probably more efficacious in restoring the voice than the external or general application, but it is also much more disagreeable to the patient and is often harmful. The direct application of the electrode to the muscles of the larynx is quite a difficult and delicate procedure, requiring considerable practice, as the least bungling or roughness will set up a spasm of the pharynx and glottis and prevent a successful application.

With a suitable laryngeal electrode, in which the current may be instantly turned on and off by pressing a button, as soon as the tip is seen in the laryngeal mirror to be in position upon the vocal cords a succession of short, rapid shocks may be passed thru the larynx. This should be done three or four times at each sitting.

Generally the electrode is kept in the larynx for three or four seconds each time it is introduced. The opposite pole should be placed low down on the neck over the cricoid cartilage. While the internal electrification requires especial skill in handling the electrode, the external method is much more easily performed by the operator and is within the reach of any physician who understands the galvanic or faradic current and its ordinary application. The external application of electricity is also more agreeable to the

patient and in the greater number of cases will give more beneficial results.

In the few cases in which it fails to give quick results the internal application directly to the parts may be resorted to, but it is advisable always to try the most agreeable method for the patient first, even in those cases which have persisted for several months.

The external application of the faradic current for from two to five minutes is of benefit in the treatment of nearly all inflamed and irritable conditions of the throat, and when continued for some time exerts a tonic influence on the larynx.

Electrical treatments are especially beneficial in functional diseases of the larynx associated with hysteria or anemia, and should always be resorted to early in this class of cases. All local treatment is very much aided by general electrification by means of a mild static breeze or by a general application to the throat of a high-frequency current. Subacute and chronic irritations of the larynx and pharynx are also much benefited by this method of electrification in addition to suitable sprays and local applications directly to the diseased surface.

In aphonia electricity is of the greatest service.

To intelligently apply the proper electrical treatment it is necessary to have a definite knowledge of the general nature of the lesion and to appreciate the exact pathological conditions in each case.

Above all it is necessary to determine whether the symptoms are of an organic or of a functional character. Mackenzie adopted the following classification of paralyses of the muscles of the larynx, which one should bear in mind:

- (1) Bilateral paralysis of the adductors.
- (2) Unilateral paralysis of the adductors.
- (3) Bilateral paralysis of the abductors.
- (4) Unilateral paralysis of the abductors.
- (5) Paralysis of the tensors.
- (6) Paralysis of the laxors.

Bilateral paralysis of the adductors is most frequently due to hysteria and debility or fatigue, and is but a local manifestation of some constitutional disorder. It yields quickly to general as well as local electrical treatment.

Unilateral paralysis of the adductor may be not only due to phthisis, but is usually due to some toxic poisoning, to syphilis, to cold and to cerebral disease, and is naturally more persistent than bilateral paralysis. Bilateral paralysis of the abductors is usually due to some central difficulty and is more serious and less amenable to treatment. Unilateral paralysis of an abductor, while due to the same general cause as the bilateral paralysis, is more often excited by some peripheral irritation, as pressure on the recurrent or pneumogastric nerve by an aneurism or enlarged gland and is equally unfavorable to treatment. Paralysis of the tensors and laxors, either unilateral or bilateral, results in the majority of cases from too prolonged or violent use of the voice and is quite amenable to electrical treatment. All nervous affections of the throat, such as spasm of the glottis (laryngismus stridulus), anesthesia and hyperesthesia of the larynx, and nervous cough may be much benefited by the external application to the neck of fifteen to twenty milliamperes of the galvanic current, the anode to the back of the neck, the cathode to the throat.

#### Continuous Electrical Service.

President Charles W. Eliot, of Harvard University, made a notable and profound address on labor problems before the Central Labor Union at Faneuil Hall, Boston, on the evening of February 7, at which, among other truths, he recognized the necessity of absolutely constant and continuous electrical service for light, telegraph and telephone, as being necessities of life.

He said:

People can wait for cigars or cash registers, or even for houses and shops; but they can not wait long for food, or domestic fuel, or, in cities, for the water which must be pumped by coal, or for the street lights produced by coal. Already in the United States the supplies of these necessities of life in modern society have been seriously threatened, and indeed, for brief periods, partly cut off.

From such dangers society must find a sure way to defend itself. The total interruption of the postoffice, telegraph or telephone service, or municipal water supplies is not to be contemplated by modern society. Other modes than strikes or lock-outs must be used for adjusting wages and hours of labor in such services as these.—*El. Review.*

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#### The Electrochemical Equivalent of Silver.

Various careful attempts to determine the electrochemical equivalent of silver give values varying from 0.011156, as determined by Mascart, to 0.011195, that found by Pellat and Leduc. A determination made by G. Van Dijk and J. Kunst gives as a mean value of twenty-four measurements, 0.0111818, a value which the authors believe to be accurate within one part in 10,000.—*El. Review.*

# EDITORIAL

The American Electro Medical Society will hold its second annual meeting at Chicago early in December.

We regret to learn of the death of the wife of Dr. John T. Pitkin, of Buffalo, July 20th, at her home, and tender our sincere sympathy to Dr. Pitkin, who has a warm place in the hearts of all electro-therapeutists.

Professor Goldsborough, whose face adorns this issue, is exhibiting the amount and variety of energy that his friends expected from him in pushing the electrical department of the World's Fair. His strong personality and well known ability as an electrician have contributed not a little to his marked success in this task.

#### St. Louis Meetings.

The International Electrical Congress meets at St. Louis from the 12th to the 17th of September. Simultaneous conventions and joint sessions will be held by the American Institute of Electrical Engineers, the American Electrochemical Society, the American Physical Society, the American Electrotherapeutic Association, the Association of Municipal Electricians, and some others.

The American Roentgen Ray Society meets Sept. 8 to 13 at St. Louis.

**Fourth Pan-American Medical Congress**—The next meeting of the Pan-American Congress will be held in Panama the latter part of December.

The Pan-American Congress meets every three years. It was started by Dr. William Pepper of Philadelphia, Dr. C. A. L. Reed of Cincinnati, Dr. Albert Van der Veer of Albany, and Dr. H. L. E.

Johnson of Washington. The first meeting was held in Washington in September, 1893, the second in Mexico in 1896. The third was to have been held in Venezuela in 1899, but was given up on account of the war in that country. The place of meeting was changed to Cuba, but had to be postponed until 1901 on account of the fever there.

These meetings have always been well attended and it is thought that Panama will be an interesting place for the convention.

Further particulars will be sent out from time to time to the Journals, together with notifications of the different officers appointed to represent this and other countries.

RAMON GUITERAS,  
Secretary of the International Executive  
Committee.

#### Special Offer to New Subscribers.

During the next four months new subscribers to the AMERICAN X-RAY JOURNAL can get the JOURNAL for one year for only *one dollar*; to those living in Chicago or in foreign countries the price is a dollar and a half. Old subscribers whose subscriptions are paid in advance will receive a time credit which will give them an equal advantage.

We believe that there are a large number of physicians who want this JOURNAL and who will be glad to pay the regular subscription price as soon as they read it and realize its value. Everybody interested in progressive therapeutics ought to read it for the condensed news of the latest methods and results. It covers the whole field of therapeutics except surgery and drug medication.

## Electro-Therapy.

A Course of Twenty-four Lessons under the auspices of the Chicago College of X-Ray and Electro-Therapeutics.

Lesson 13—REFLEXES.—By T. Proctor Hall, Ph. D., M. D.

When a stimulus of any kind applied to a living body results in some activity of that body, the action is said to be reflex. It is understood that in such cases the energy of the action comes from the body, and that the stimulus acts in the same way as a spark to powder, or as touching the trigger of a gun. Of these reflex actions there are two varieties, direct or muscular, which are independent of the central nervous system and are produced by mechanical or other stimuli applied directly to the muscles; and sensory, which are produced by a stimulus acting first thru a sense organ, proceeding thence to the central cells, and giving rise to a motor impulse from that point.

The direct or muscular reflexes are used therapeutically in developing the muscles or in preventing degeneration in cases of serious interference with the normal nerve stimulus. The therapeutics of this kind of reflex is consequently very simple. Either the faradic current or the interrupted galvanic current, or both, may be employed for this purpose.

The condition of a muscle with regard to degeneration may be inferred from its reactions to the faradic and galvanic currents. Electro diagnosis is important in some cases in order to enable a correct prognosis to be made. But in nearly all cases for therapeutic purposes a rough determination of the ability of the muscle to respond to electric and mechanical stimuli is all that is required. If any muscular power is left there is hope of improvement. If the muscular response is good the question of cure depends upon the condition of the nervous system. Given abundant nutrition and either

natural or artificial exercise under fairly normal conditions and the muscular power will at any rate not decrease.

The muscular reflexes are measured by the amount of current which is required to cause a perceptible contraction when the current is suddenly started or stopped. A milliamperemeter is required, a rheostat for increasing or diminishing the current gradually, and a make-and-break apparatus. The latter may be done by hand. The points at which the nerve is close to the surface are known as motor points. The current applied at these points causes contractions much more readily than when applied elsewhere.

Dr. Clevenger has proposed a simple nomenclature for these diagnostic reflexes. The letters K C stand for kathodal closing and A C for anodal closing. Added to each of these is a figure denoting the number of milliamperes required to produce contraction. The formula K C 1 indicates that when the cathode is on the motor point of that muscle one millampere is required to cause contraction. For ordinary muscles in normal condition one or two milliamperes is sufficient. For the anodal closing a little more current is required to produce contraction, two or three milliamperes being the average. There is considerable variation in these numbers even in health, but the K C is always less than the A C. In most conditions of muscular degeneration, tho not in all, these numbers are reversed, the K C requiring a greater current than the A C. Other reactions are the anodal opening and the kathodal opening, which are designated in a similiar way but which are of very little practical importance.

The nervous system is included in two main divisions, the voluntary or conscious brain with its accompanying motor and sensory nerves, and the "sympathetic system." In reality only a small part of the voluntary nervous system is directly concerned with consciousness. But it is the machinery by which we come into relation to the outside world. The involuntary system is concerned with the internal conditions of the organism. Its operations are entirely unconscious. Its actions are slower, and it does not respond directly to our will. A large part of the unconscious operation of the voluntary nervous system is more expressively termed sub-conscious. Of all the sensations which reach us we are fully conscious of a very few; many of the rest are stored away in the central nervous system to be consciously or unconsciously revived later. Others never reach the threshold of consciousness, but produce reflex actions which are necessary to our normal existence. The whole field of sensation is aptly compared to the solar spectrum. The comparatively small field of consciousness corresponds to the visible part of the spectrum of the body, causing the ordinary "tone" containing the colors of the rainbow, and the sub-conscious regions correspond to the much larger invisible spectrum consisting of the infra-red and ultra-violet rays.

For therapeutic purposes it is not necessary to draw a distinction between the conscious and the sub-conscious reflexes

since they all follow the same law. Very mild sensations, either from without or from within, which are usually sub-conscious, act upon the central nervous system and upon the ganglia in various parts of the body causing the ordinary "tone" or normal contraction of muscular and other tissues, glandular activity, etc. In case of weakness or injury these reflexes may fail at some point. If the failure is marked there will be relaxation of the muscular coats of the smaller blood vessels, causing hyperemia, with possible exudation of the serum, and perhaps diapedesis—the various stages of inflammation. In such cases a slight increase in the normal stimulus may be sufficient to restore the muscular tone and remove all signs of inflammation. Brushing the skin with a soft brush or feather, or passing the fingers lightly and repeatedly over it, or tapping with a light stick, or spraying with static electricity, or any other method which increases very slightly the normal reflex, is sufficient to restore the normal conditions.

When the sensations are made much stronger so as to approach the painful the reflex is prevented thru temporary exhaustion of the nerve cells. This results in hyperemia, and painful applications of any form produce this result. Excessive sensations may temporarily paralyze so much of the central nervous system as to relax all the blood vessels and cause the condition known as "shock."



### Proposed Experiments with X-Ray and Radium.

BY EDWARD P. THOMPSON.

Before the advent of Röntgen rays Sir John Lubbock, F. R. S., proved, by a long series of critical, varied and repeated experiments, that the invisible ultra violet rays are perceived, in some manner or other, by the insignificant yet highly interesting ant. For details of the apparatus and experiments see "Ants, Bees and Wasps," D. Appleton & Co., published in 1888. His experiments were based upon the dislike which ants, in their nests, have for light. Although they have no such feeling when out in search of food, yet if light is admitted to their nest they at once hurry about in search of dark corners, where they all congregate. If, for example, he uncovered one of the nests and then placed an opaque substance over one portion, the ants invariably made the shaded portion their rendezvous. The ants likewise carried their pupæ and larvæ to the darkest portions of the nest. This characteristic was also the basis of operations.

His first experiments related to the ants, relative avoidance of visible light rays of different colors. In all these tests the violet and purple rays affected the ants much more strongly than the other colors employed. In a general sense the transmitted light of differently colored glasses appeared to act on ants in the same general order as it does on a photographic plate. Furthermore, they preferred the violet glass to the plain, colorless glasses. In place of the latter solutions were tried, and tests involving equal temperatures were included, but the results remained the same. It is needless to say that Sir John Lubbock took every possible precaution and followed the strictest rules of scientific research.

Another series of experiments includ-

ed ultra violet rays, negatively. He had found that if the ants have to choose between the violet and other colored glasses they always preferred one of the latter. Next he found that the effect of putting over the violet glass a layer of either of sulfate of quinin or bisulfid of carbon (both of which are transparent to our eyes, but both of which cut off the ultra violet rays), the effect was to make the violet glass seem to the ants as good a shelter as any of the other colors. Hence this two-fold result is strong evidence that ants perceive ultra-violet rays.

He then tried more positive experiments with a saturated solution of chrome alum and chromium chlorid, as these are very opaque to the visible light rays, but transmit the ultra violet rays. The results were very striking. It made that portion of their nest so dark that he could see nothing. By an apparent expedient for watching their movements he found that the ants avoided the ultra violet rays. Different species of ants and different ants of the same species but of different nests behaved in a similar manner.

Whether the ants actually see some new color or light, or feel or hear it, is not certainly known; but that ants constitute a detector of the invisible portion of the spectrum beyond the violet appears conclusive to Sir John Lubbock.

I have no longer the facilities for making x-ray experiments, nor do I know if others have tested their effect upon ants, but I propose to the Carnegie Institution at Washington or to others who are experimenting in the field of ether vibrations or limits of vision in animals to determine if ants are affected by x-rays.

The electrical engineer is not so much concerned about the physiology of ants as is the naturalist, but he is anxious to add more facts for assisting in arriving at

a more exact knowledge of the nature of x-rays. So far, it is known that this form of radiant energy causes certain salts to fluoresce, and that it affects the photographic plate. Consequently it is like the short wave length from a luminous source. It is at the same time invisible to man, and is thus like either the very short or very long wave length. It is like a long wave length in its power of penetrating substances which are opaque to light. As the same wave could not be both long and short at the same time, there is no reason why it could not be a mixture of long and short waves or else some energy without waves. Until ants are experimented upon, therefore, there is a void in this department of the science of radiant energy. A short wave, or energy of the spectrum beyond the violet, trouble ants. Will these insects immediately run away from Röntgen rays?

Investigations should also include the recently discovered etheric radiations. As nine years have elapsed since Professor Röntgen made his remarkable discovery, and although all conceivable tests have been made upon radiant energy, may we not, perhaps, say, "Go to the ant, thou sluggard; consider her ways and be wise"?—*Elec. World and Eng.*

#### Electricity and Life.

Years ago, when making researches in this line, I found an animal to be opaque to electrical waves when living, and transparent to these waves after death. Since then I have discovered that the opaqueness of the body of a live animal to electrical undulations is due to the fact that every muscle and nerve in the body is electrically active during life, and is, in fact, a bundle of electrical currents, and, consequently, electric waves can not get through them. At death these electric activities cease and the

electric waves can pass through the body and make their impression on the recording screen on the other side. This shows how closely electricity is connected with life, and suggests a method of testing whether life is extinct or not; and prepares the way for other experiments. Moreover, it is a possible new mode of diagnosis, because the different parts of the body will be unequally transparent to electric waves according as they have unequal amounts of electric activity in them, as they would be likely to have under pathologic conditions. But the most important result of the experiment is this: It led to the discovery that living things give off electric waves [also "n" rays, as shown by Blondlot] in proportion to the degree of mental activity, which makes it possible to quantitatively measure conscious states. This opens a new field of research in scientific psychology—that of measuring subjective states and comparing them with each other in the same person or in different persons.

The apparatus by which the above experiment can be most easily repeated consists of an electric spark oscillator capable of giving off electric waves varying in pitch up to the highest frequency attainable—a modified form of such apparatus as is now used in wireless telegraphy—and instead of a coherer use a set of coils for transforming the electric waves into electricity so that it may be measured by a delicate reflecting galvanoscope. These wire coils must be small enough to be hidden behind the body of the animal, so as to be in the shadow with reference to the source of electric waves. If the apparatus is sufficiently delicate it will measure the waves which pass through the body of an animal after death, but will not indicate them when

the body is alive. The apparatus becomes more delicate if along with the electric waves there are projected ultra violet waves of light—which are also electric undulations, because of an action similar in discharging a static condenser they likewise act upon the coil.—*Prof. Elmer E. Gates, in Suggestion.*

**Death From Electric Shock.**—Jelinek's recent experimental researches show that various kinds of animals have different reactions against the influence of electric currents. Horses are killed by the electric current in street cables—i. e., a constant current of 460 volts—while unipolar application of constant current of 110 volts has a bad effect after a time. Small animals, such as rabbits, dogs and guinea-pigs, are more resistant, while frogs and tortoises are not killed by currents of 10,000 volts. Death occurs through paralysis of the heart and respiration, and animals which recover show similar symptoms to those which occur in man after lightning stroke, such as paralysis, coming on after an interval sometimes, hemorrhages, and ocular lesions. The injury to human subjects through electricity depends not only upon the tension and amount of the current, but, and in particular, upon the re-elongation of the heart.—*Ex.*

#### Glimpses of Steinmetz.

In the June *World's Work* Arthur Goodrich tells some interesting stories about Mr. Charles P. Steinmetz, chief engineer of the General Electric Company at Schenectady. "One of his ablest assistants spent a number of days of hard work in solving an intricate mathematical problem. When he had finished it he asked Steinmetz to work it out. The inventor grasped the problem at once, counted on his fingers a few times, and gave the cor-

rect answer without touching pencil or paper. Yet he remarked recently: 'Mathematics is valuable only to obtain results. Mathematics for mathematics' sake is foolishness.'

"Some years ago Steinmetz went into the Adirondacks with a hunting party of friends. Not caring to hunt, he was often left alone at a little lodge that was made the party's headquarters. One night before the camp fire a mathematical question came into his head. To settle it he needed a table of logarithms which could not have been found within miles of the camp. He remembered a few figures, and in a short time had worked out an entire table of logarithms for himself, and from it solved the problem. This mathematical sense, which was originally trained by hard study at Breslau, makes it possible for him to answer quickly the rapid fire of questions his aids hurl at him daily.

"The laboratory workers come to him constantly for advice and direction. Eighteen thousand employes stand ready to work out his ideas. With the men he is always genial and democratic. When any business matter needs settling he does it in determined fashion. He is as independent as he is good-natured. When the heads of the works made a rule against smoking in the factory, Mr. Steinmetz said he would smoke or leave. He did not leave. 'He can accomplish more in an hour,' said one of his assistants, 'than I can do in a week.' If some difficult problem needs solution at the works, it is nearly always taken to Steinmetz.

"Not long ago there was an explosion in a manhole in New York City, which made great trouble for an electric railroad. Many local engineers tried to find out the cause of the trouble, and gave various unsatisfactory explanations. The matter was brought to Mr. Steinmetz's attention. In

a few moments he asked how certain adjacent wires in the manhole were covered. Here, indeed, was the trouble. It was simple, but no one else had thought of it. He takes the short cut to the essential thing. It is characteristic of all his work."—*Electrical World and Engineer.*

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**Otto Schmidt's Treatment of Cancer.**

Ours is not the only public infested by the octopus called "quack." John Shaw (*Medical Press*, March 16, 1904) states that while journeying in Switzerland he took occasion to study, at one month's interval, the effect of this widely advertised treatment on some of his countrymen and women who had been seduced into taking it. It is the same old story of injections, promised cures, sloughings, delays and ultimate recurrences. The author was unable to obtain any satisfaction from Dr. Schmidt, and when he remarked that a certain patient, who was about to be discharged "with the cancerous process arrested," be sent to Professor Von Bergmann in order that his opinion as to the alleged arrest might be obtained, Schmidt replied: "Es hat keinen Zweck." In the opinion of the author it is desirable that before any further exodus of English people takes place to this sanitarium it should be further investigated.—*Medical News.*

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**Professor Rutherford on Radium.**

No man has done more than Professor Rutherford to elucidate the nature of the processes going on in radio-active substances. His highly original and delicate experiments, and his masterly analysis of the evidence provided by these experiments, have revolutionized our ideas of molecular and atomic physics, and revealed to us the existence in matter of an unsuspected source of energy. It is not to be wondered at, therefore, that his lecture at the Royal Institution on the 20th

ult. attracted a crowded and brilliant audience. So great has been the interest in radium, and so much has been published about it in technical and other journals, that it was difficult even for Professor Rutherford to tell us anything new. The emanation from radium received special attention in the lecture. The lecturer stated that the emanation, though exceedingly minute in quantity, contained three-quarters of the whole energy of radium. If we could collect a cubic inch of the emanation, the tube which contained it would probably melt, while a few pounds of the emanation would supply enough energy to drive a ship across the Atlantic. The energy of the emanation does not last very long, since it falls to about half its original value in four days. Recent discoveries point to the conclusion that radium is widely distributed through the substance of the earth. The emanation has been found in the discharge of deep springs, in volcanic mud, and in clay soils in many parts of the earth's surface. This suggests the theory that the internal heat of the earth is due to radium, and if this be true it must lead to an important modification in the period calculated for the age of the earth by Lord Kelvin. Nothing could better illustrate the immense increase in the resources of scientific research than the rapid development of the apparently insignificant experiments of Becquerel into the present far-reaching theory of radio-activity.—*London Electrical Review.*

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**Hot Air Treatment.**—Dr. De Lancey Rochester, of Buffalo, said that even without the cumbersome hot-air apparatus it is possible to obtain good results in the treatment of arthritis deformans. Hot-air baths may be given in bed by means of a spirit lamp, and if followed by friction of the skin, relaxation need not be feared.

Massage, careful passive movements will also be found of service. The affection occurs not infrequently in stout people and in these particularly sweats and massage are likely to be of service. The regulation of diet should exclude sweets and not much starch should be allowed. Fresh green vegetables, which contain organic iron in a form readily available by the system should be freely used. Where there is any tendency to constipation, salines should be given.—*J. A. M. A.*

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**Two Cases of Severe X-Ray Necrosis.**

Clarence E. Skinner reports two cases of severe x-ray necrosis presenting some unusual features. The history of these cases is interesting, but a perusal of the author's conclusions is of value, especially to those who are entering upon the field of x-ray work. They are as follows:

First, the belief, somewhat extensively held, that a patient who "tans" well need not fear a burn, is demonstrated by these cases to be untenable. Both of these patients tanned readily and profoundly.

Second, the "tanning" and excessive epithelial proliferation of the new skin observed in Case I, and the profound erythema and structural changes of the new skin observed in Case II, all of which modifications obtained in tissues which had developed months after exposures to the rays had ceased, indicate that the physiological action of the x-light is not confined to stimulant or destructive influence upon tissues that already exist, but that it is capable of modifying most profoundly, and more or less permanently, the developmental functions which control cell growth. I have previously expressed a belief in this phase of influence, and that we shall ultimately find that it plays no small part in the beneficial effect exerted by the x-ray upon many cases of malignant growths.

Third, the abrupt cessation of the sharp, cutting pains simultaneously with the final separation of the necrotic tissue, would point to direct irritation by the sloughing mass, of the distal ends of nerve trunks supplying the affected parts as their exciting cause, probably through the development of toxins by retrograde tissue metamorphosis at the line of separation; a pure neuralgia in short, and which would indicate extirpation of the necrotic area by curettage or otherwise as a logical management for x-ray dermatitis of this degree.

Fourth, the accelerating influence of the direct electrical current upon the process of healing after the slough had separated, noted in both cases, is significant from a therapeutical standpoint. The power of the negative pole of the direct electrical current to hasten repair in open sores of various sorts has long been known to electrotherapeutics, but the x-ray ulceration has exhibited a peculiarly intense resistance to all ordinary measures available for this purpose, and the knowledge that we have in this modality an effective curative agent even in this condition constitutes a comfortable thought. It is probable that skin-grafting will be avoidable in many cases where galvanism is available.

Fifth, the appearance of new areas of necrosis, in Case I five months, and in Case II six months, after the last x-ray exposure had been made, admits of three hypotheses in the way of explanation. It might have been due to a cumulative characteristic of the ray, whereby the direct effect of the exposure did not fully develop until after these lapses of time; it may have been due to a modifying influence exerted by the ray upon the developmental functions of the cells involved, whereby the younger generation of cells were unable to acquire the degree of vitality necessary for the maintenance of

tissue integrity; or it may have been the indirect result of circulatory insufficiency caused by an x-ray endarteritis obliterans which had required this length of time for its full development. None of these are entirely satisfactory, however, and we shall have to await the acquisition of a fuller knowledge of the modus operandi of x-ray effects before we can decisively account for this, and many other of its vagaries.

Sixth, the sedative effect of anesthesine upon the pain in Case I, and its aggravating influence in Case II, illustrates the statement frequently made, and the truth of which is now pretty generally admitted, that no two cases of x-ray pain can be depended upon to react uniformly to the same palliative agents. "What's one man's meat is another man's poison." Each case must be treated according to its own individual peculiarities, and usually the only way to ascertain the peculiarities is to begin at one end of the list of therapeutic agencies and apply them successively until we find one that is effective.

Seventh, the sudden and constant appearance of subcutaneous hemorrhage preceding the development of necrosis noted in Case II is worthy of record, but I do not at present comprehend its significance, nor can I offer a satisfactory explanation.

In conclusion, the histories to date of these two cases constitute a warning against exposing a patient to the x-rays with even a moderate degree of frequency through long periods of time, no matter how well they seem to bear them at first. There are few conditions so pregnant with torture for the victim as a deep x-ray dermatitis, and the risk of precipitating such a disaster is only justifiable in cases presenting an absolutely hopeless prognosis under other methods of treatment.—*Medical Standard.*

### Some Unappreciated Uses of the X-Rays.

BY ALFRED L. GRAY, M. D., RICHMOND, VA.

It is not my intention in this brief paper to introduce into the realms of radio-therapy or radio-diagnosis any innovation, but merely to call the attention of the profession generally to some of the more unusual purposes to which the x-ray may be applied, that are fully as important and equally as valuable in the field of diagnosis as those of every day usage.

There are no means at our disposal, as is now well known by all of us, that can compare with the Roentgen rays in the diagnosis of diseased or injured bones, the location of foreign metallic bodies, calculi, etc. But how few of us make use of this most convenient and accurate method of determining the existence of certain pathological conditions in the soft structures? It is as a plea for the more frequent use of the rays for this purpose that this paper is intended.

There is scarcely one of the many serious diseases affecting the thoracic viscera concerning which the skilled employment of the x-ray does not furnish additional valuable information. Many pathological conditions existing within the abdomen and its walls may also be accurately diagnosed by this means.

Probably the value of the x-ray in the diagnosis of thoracic aneurism is the most widely appreciated of the uses to which it is my desire especially to call attention. The importance of this means of diagnosis of this often, most obscure and sometimes otherwise undeterminable condition, can not be too strongly emphasized.

The frequency of the existence of this disease is far greater than is generally believed, and often will it be found that prolonged hoarseness, intractable coughs believed to be due to chronic bronchitis, and many other chest symptoms are in

reality due to the presence of thoracic aneurism. Within the past six months I have discovered aneurism in five cases that were referred to me with no positive evidence of this condition existing.

The diagnosis is simple and unmistakable, and is best made with the fluoroscope, save in case of very small tumors, for the pulsations may be readily seen in this way, whereas the radiograph may not distinguish this from other tumors within the thorax.

The second use to which I would call attention is in diseases of the lung. By means of the radiograph, areas of consolidation too small and deep-seated to be detected by a physical examination, may be readily demonstrated and thus a circumscribed pneumonia or beginning phthisis may be diagnosed. By comparison of radiographs taken from time to time we may watch the progress of the disease and may note any increase or diminution of the diseased area.

Cavities may be readily detected and located and the presence or absence of an abscess ascertained.

The radiograph will easily demonstrate pleuritic effusion, empyema or pneumothorax. Hypertrophy and dilatation of the different chambers of the heart may be plainly shown, and in some instances atheroma of the aorta has been found.

Much valuable information may likewise be obtained from examination by the rays of the abdominal contents, though this is usually much less satisfactory than chest work.

Abscesses of the liver and other abdominal viscera, if they are of considerable magnitude, may readily be shown. By a radiograph alone I was enabled to discover a case of atrophic cirrhosis of the liver, and subsequent clinical evidence verified my diagnosis.

Splenic enlargement and, in some in-

stances, hypertrophy of the kidney can be detected.

It is claimed by some radiographers that they have, with the latest improved apparatus, been able, by short exposure, to photograph not only the normal kidney but also the pancreas. I have not succeeded in obtaining a satisfactory picture of either of these organs when normal.

Abdominal and pelvic tumors may often be found and their nature practically ascertained.

Still another fact that may be of inestimable value is that coagulated blood is more or less opaque to the rays. By reason of this we may not infrequently locate an intra-cranial clot, thus enabling the surgeon to proceed with its removal with certainty as to its whereabouts.

I have recently made some exceedingly interesting radiographs of the roots of teeth in their sockets, showing their shape and condition, a correct knowledge of which is essential, especially in dental prosthesis.—*Virginia Semi-Monthly*.

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**The Roentgen Ray in the Treatment of Leukemia.**—W. J. Taylor, in the *Cincinnati Lancet-Clinic* of May 14, 1904, describes the case of an unmarried woman twenty-four years old. The patient had never been robust, though her health had been fair up to her twentieth year. Two years before coming under observation there was a noticeable enlargement in the upper left quadrant of the abdomen accompanied with a feeling of fulness, distress, and pain. There was a daily rise in temperature, and the diagnosis of malaria was made. In October, 1903, there was marked enlargement of the spleen; the lower border was down to the left ileum and extended one and one-half inches to the left of the umbilicus. There was a well defined notch in the anterior border. The skin and mucous mem-

brane were pale and of a muddy color. Emaciation was extreme, and there was persistent digestive disturbance. For months the diarrhea had been almost uncontrollable, and vomiting was a troublesome feature. The slightest exertion brought on dyspnea and faintness. There was no tenderness of the bones or joints. The blood examination showed 1,575,000 red cells, 147,000 leucocytes, and hemoglobin 24 per cent. Daily x-ray treatments over the region of the spleen were begun. On the third day vomiting stopped, and on the sixth day the patient gained control of her bowels. A blood-count a week after beginning the treatment showed an improvement. By the latter part of November the spleen had grown much smaller, the leucocytes had decreased to 7,480, and the hemoglobin had risen to 37 per cent. The spleen was scarcely palpable below the costal margins. In December the patient died of some complication, during which there were meningeal symptoms.—*Medicine*.

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**A Case of Splenomegalyous Leukemia Improved Under the Use of the Roentgen Ray.**—C. H. Weber (*American Medicine*, May 21, 1904) reports the case of a widow aged fifty-three years whose illness began with a pain in the splenic region. The pain was sharp and shooting, and was increased on pressure or deep inspiration. The diagnosis of pleurisy was made. Shortly after this attack she observed that the abdomen was enlarging and that deep inspiration was difficult. There was loss of appetite and continuous headache. At the time of admission the patient was fairly well nourished, though she had lost flesh for several months. The complexion was clay-colored, the spleen extended a fingerbreadth to the right of the median line and below to within an inch of the crest of the ilium.

The urinary examination was negative. The red blood-corpuscles numbered 2,400,000, the white blood-corpuscles 328,000, hemoglobin 30 per cent. The patient was under observation for a period of less than six months, during which time there was a steady improvement in her general condition. For the last five months of this period she received no medication, only the Roentgen rays. There was no fluctuation in the blood-counts, but a steady improvement and a gradual extinction of the myelocytes. The final blood-count showed 4,720,000 reds, 7,200 whites, and hemoglobin 72 per cent. The subjective conditions all improved, and the blood findings at the end were normal.—*Medicine*.

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**Common Sense and Radium.**—The *Medical Record* of May 14, 1904, in an editorial says that the real and alleged properties of radium seem to have overturned the reasoning faculties of a large portion of the public and some of the medical men. Statements are constantly advanced as to the marvelous events that can and will be brought about through the influence of radium. A French scientist has affirmed recently that the heat rays of radium are capable of melting stones and disintegrating, with great celerity, iron and steel, so that the effects of the rays will destroy fortifications, crumble battleships and will extinguish human life like dew before the morning sun, thus rendering warfare impossible. Commenting upon these claims A. F. Collins, in the *New York Times* of May 8, says that radium can not compete with ultraviolet light in its healing properties. There are no diseases for which the x-ray or ultraviolet radiations are not superior and do the work quicker and better than radium. A grain of radium having a radioactivity of 20,000 costs \$1,250, consequently few

physicians possess the substance in such activity, must use those of 1,000, 3,000 or 7,000. These exercise a very slight effect upon malignant growths.—*Medicine*.

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**An Experimental Research on Radium, Radioactive Substances, and Aluminum**

—M. Metzenbaum (*Cleveland Medical Journal*, May, 1904) gives some interesting observations along the lines of investigation marked out by Becquerel. A piece of Bohemian pitchblende placed on a bare photographic plate produced its own image and affected the plate for one-half inch from its border. The same piece of pitchblende placed on the reverse side of the photographic plate covered with black paper and allowed to remain five days not only affected the plate under the object, but for three-quarters of an inch from its circumference. A hermetically sealed tube of very thick glass containing five grains of pure metallic uranium was placed on a photographic plate covered with black paper. After 120 hours it gave a deep print of itself. From these and somewhat similar experiments with uranium the writer forms the conclusion that the various uranium salts are capable of affecting a photographic plate, and that these rays can penetrate black paper, aluminum, bone, and glass, and that they act at a distance of several inches. At a distance of one inch it requires about twice the length of time for the rays to act as compared with their effect when only separated from the photographic plate by black paper. After several months uranium salts have lost none of their radioactivity. The experiments performed with thorium were the exact duplicates performed with uranium. The results were the same, excepting that the action on the photographic plate was

prompter. Zorconium was found even more radioactive than thorium.—*Medicine*.

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**Pruritis Ani Treated by X-Rays**—Pennington (*New York Medical Journal and Philadelphia Medical Journal*, February 20, 1904) reports thirteen cases of pruritis ani treated by exposure to the x-ray.

Most of the cases were cured, and though still under treatment, all improved. In none of the cases has there been produced a dermatitis, or any other ill effect. The skin is left smooth, soft, clean and pliable. While there is no objection to the use of other procedures in conjunction with the x-ray, yet none were employed in these cases, and the results have been so similar and constant in all of them that they are undoubtedly due to the action of the Roentgen ray.

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**Photographic Action of Radium Rays.**

—Since a photographic plate by exposure to radium rays is affected in such a way that the plate develops similarly to its development after its exposure to light, Skinner has made experiments to find whether the actions are the same in both cases. His results seem to indicate that only slight differences occur in the early stages of development. For prolonged exposure he reaches the following conclusions: The density of the image produced on a plate by exposure to radium rays ( $\beta$  and  $\alpha$ ) increases to a critical value and then decreases, first rapidly and afterward very slowly, until a time is reached when the image is totally reversed. Spark images are at first obliterated by radium rays which do not cause such a great density as that of the spark images obliterated. With prolonged exposure, radium rays reverse spark images.—*Phil. Mag.*, March.

**The Results of X-Ray Treatment.—**

Samuel Beresford Childs (*N. Y. Med. Jour.*, July 2) concludes from his own experience and that reported by others: First: The therapeutic field of greatest usefulness of the x-ray is with superficial epitheliomata, rodent ulcer, and lupus vulgaris, when the area involved is conspicuous, as on the face or neck, and where a cosmetic result is particularly to be desired. Second: Healing by the x-ray leaves the smallest and least perceptible scar; for, when properly applied, it destroys only diseased tissue, and particularly commends itself for use in those localities where it is undesirable to sacrifice the surrounding tissues. Third: The x-ray is very efficacious in many obstinate cases which have resisted the ordinary methods of treatment, such as acne rosacea, chronic localized patches of eczema and psoriasis, lupus erythematosus, and kindred skin diseases. Fourth: The results in tuberculous glands, when no suppurating focus is present, are encouraging and the enlarged mass of glands in Hodgkin's disease appear to be susceptible to the treatment. Fifth: The x-ray should not be employed in any operable, deep, malignant growth, with two exceptions: First: as pointed out by Coley, where a surgical operation would sacrifice an extremity, and even in this case the value of the x-ray is uncertain, and is determined by a few weeks' trial. Second, as mentioned by Pusey, with a view to limiting the operation by checking the growth when immediate operation is inadvisable. Sixth: The x-ray may be of service even in inoperable malignant growths, by relieving pain, diminishing discharges, and lessening their offensiveness, and in many cases life may be prolonged in comparative comfort for a considerable period of time. Furthermore, from these apparently hopeless cases a number of remarkable

improvements and a few recoveries have been reported. Seventh: The x-ray should be used as a prophylactic against return after all operations for the removal of deep malignant growths. Eighth: The area of exposure should be wide, and the intensity and quality of the rays should be adapted to each case.—*Med. Record.*

**Results With the Use of Radium.—**

Dr. Robert Abbe, at the American Surgical Association at St. Louis, demonstrated a very powerful specimen of this element and presented a complete series of casts, photographs and radiograms which demonstrated the experiments he had been carrying on. He showed among other things the results of his experiments on the effect of exposure to radium rays plant life growth is markedly retarded. In like manner exposure to radium interferes with normal development of worms. Under the rays the worm lives, but remains a worm.

**Therapeutic Value.—**On small superficial epitheliomata the rays work well. They destroy, not as a cautery, but by some unknown subtle power. This power is a factor to be reckoned with, but as it is ten times more efficient than the Finsen light so is the x-ray tenfold the worth of the radium ray.

Dr. W. W. Keen, of Philadelphia, in discussing this paper said that he had employed radium in twenty-two cases, and that not in a single one was there any appreciable result save that the pain was stayed. He had temporarily relieved a case of tic douloureux. Possibly it was the type (German) of radium he used, but its strength had been reported to be 1,200,000.

Dr. Abbe, in closing, said that he never had intended to suggest the matching of radium against the x-ray. He reported what he did simply for scientific and pathological interest.

**Further Observations on the Therapeutic Value of Radium and Thorium.**—J. M.

H. MacLeod concludes, in regard to the therapeutic value of radium bromide, that its chief utility is in the treatment of rodent ulcer, and in the case of small rodent ulcers it acts almost like a charm. In rodent ulcers of a diameter larger than a shilling, treatment by the x-rays is more practical, as the whole of the ulcer can be exposed at once. In some cases of rodent ulcer which have been subjected to a long series of exposure to the x-rays, these rays seem to lose their effect, and the healing process becomes stationary. Radium may then be used with advantage, and the healing again stimulated. The writer believes that radium is of little value in regard to epithelioma. In the case of cancer of the uterus, further experience is necessary before any definite statement can be made. In lupus vulgaris, radium causes the disappearance of the granuloma and a replacement of it by healthy scar tissue, but this treatment is practical only in very small lesions. It is a useful adjuvant to the Finsen light and x-rays, as it can be applied to positions which are difficult to get at. In lupus erythematosus its value seems to be negligible. The results of the use of thorium do not appear to be at all encouraging.—*Med. Record.*

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**Radium and the X-Ray.**

The general discussion in the medical and lay press concerning the wonders of radium and the allied substances thorium and polonium, has aroused the public and the professional expectations to a pitch unwarranted by the results so far obtained.

As a matter of fact radium does not possess the power of penetration of the x-ray, which limits its field to the more superficial conditions. The blending of the three distinct radiations which characterize this remarkable substance may

adapt it to the successful treatment of certain conditions in which the x-ray does not succeed so well. On the other hand, it is probable that this very combination is certain to prove an objectionable feature.

As demonstrated the most penetrating of the radium rays, the  $\gamma$  (gamma) rays, are analogous to the x-rays, which explains the similarity of their action.

Observation to the present time has failed to demonstrate any striking advantage of radium. In a few instances its employment in association with the x-ray seems to have produced a better result than from the latter singly.

As to the probable therapeutic value of the internal administration of fluids rendered fluorescent by radium there is little to be expected, as solutions so affected lose that property when new chemical combinations are formed. At the present time those who have become familiar with the valuable therapeutic properties of the x-ray are not likely to set it aside for radium. In the superficial cases when the x-ray for reasons has failed, and in others, radium may assert superior effects and win a valued recognition. It deserves a thorough trial, but must be employed with great care and discrimination.—*Physical Therapeutics.*

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**Failure of Electrocution.**—At the Ohio Penitentiary annex during the past week two miserable failures have occurred in electrocuting condemned men. Michael Shiller was given an initial shock of 1,750 volts, but revived; later he received 1,900 volts for eight seconds; this was run down gradually to 250 volts during fifty-three seconds, after three minutes he again revived and was again exposed to the current for two minutes. Moses Johnson, the second victim, requiring eighteen minutes of intermittent shocks before he was pronounced dead.—*Med. Record.*

**Radiotherapy in the Treatment of Tumors of the Stomach.**—Doumer and Lemoine have treated twenty gastric tumors by this method. Of these they believe that three cases were completely and finally cured. A fourth is on the way to recovery, while a fifth in whom the improvement was very rapid, and in whom the tumor completely disappeared, has had a relapse that does not yield to treatment. In the other cases the tumor has had a variable course according to the case. In all of the cases without exception this treatment has caused the disappearance of, or great diminution of, pain, and this from the first application. Vomiting has ceased or has greatly diminished, and feeding has thus become much easier. Without any doubt the general state has been greatly improved. Doumer and Lemoine conclude that there are certain forms of gastric tumors in which this treatment has worked a complete cure, lasting so far for a year and a half in several cases, and other forms in which the treatment has been incomplete in its effects, destroying the tumor in its original place, but not hindering its extension to neighboring parts and its metastases to distant parts.—*Le Bulletin Médical*, June 15, 1904.

#### Reaction After the Use of the X-Rays

—It is claimed by H. E. Schmidt (*Deutsche med. Woch.*, May 12, 1904) that there are premonitory signs which he terms "Frühreaktionen," which come on within a few hours after an effective application of the x-rays. These are not uncommon and are erythematous in character. They must be distinguished from the dermatitis usually associated with x-rays and which is not apparent until eight to fourteen days after their application. This erythema is independent of the age of the tubes and has only been observed in isolated cases, where a particular predis-

position seems to be present and where recurrence is almost invariable. The phenomenon apparently depends on some peculiar sensibility of the circulatory system to the rays, similar to that which has been demonstrated for other influences of a psychic, toxic or thermic nature.—*Medical News*.

#### Atmospheric Radioactivity.

Recent investigations have shown that radioactive gas may be obtained from water and from petroleum, this gas having the same properties as the emanation from radium. These facts suggested to Dr. H. A. Bumstead that some of this emanation must be present in the air above ground, and that the radioactive phenomena of the atmosphere might be due to its presence. An investigation has been carried out to determine whether such was the case. A long wire was stretched between two buildings and connected to the negative pole of a Wimshurst machine driven by a small motor. The other terminal of the machine was connected to the earth, and a parallel spark-gap kept the potential difference between the two constant. After allowing the wire to remain in this position for some time it was coiled up on a frame and placed within a cylindrical testing vessel, and the effect upon an electrometer noted. Curves were traced, showing the decay of the radioactive property of this wire, these curves showing a decided resemblance to radium emanation during the first two hours. When, however, the experiments were extended over a longer time, it was found that the rate of decay changed, becoming much slower than for radium. A possible explanation of this is that the radioactivity of the air is due to a combination of radium and thorium. The possibility of the presence of actinium was investigated and found to be improbable. The con-

clusion is reached that the radioactivity acquired by a negatively charged wire exposed to the open air is mainly, if not wholly, due to the excited activities of the radium and thorium. With a three-hour exposure three to five per cent of the total initial effect is due to the thorium activity. With a twelve hour exposure the thorium activity is sometimes fifteen per cent of the whole. There is some evidence that a small quantity of a more rapidly decaying activity is present in addition. It is thought that the radioactivity of rain and snow is due to radium-excited activity, the absence of the thorium effect being accounted for by the fact that the rapid decay of the thorium emanation prevents its reaching, in appreciable quantities, the height at which the rain drops are formed.

—*Abstracted from the Am. Journal of Science, July, in El. Review.*

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**X-Ray of Cervical Rib.**—Dr. D. N. Eisendrath showed a skiagraph from a patient, fifty-six years of age, who consulted him on account of recurrent hemorrhages apparently from the lungs. The skiagraph showed beautifully the cervical rib. As regards the origin of this cervical rib, the only way one could understand them was to consider them as a reversion of type of the mammalia toward some of the elementary forms. This cervical rib existed in reptiles. It must be regarded as an abnormal development of the anterior nucleus of the transverse process of the seventh cervical vertebra.—*Med. News.*

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"I can't understand all this fuss about using electricity for executions," remarked Judge Lynch reflectively. "Out in our section we have used the telegraph poles for years."

#### **Roentgen Rays in the Dublin Law Courts.**

The surgical possibilities and the legal liabilities of the use of the Roentgen rays were—for the first time within the British dominions—exhaustively investigated in the Dublin Law Courts last month. A lad, a resident of Galway, the seat of one of the "Queen's Colleges," was suspected of having needles lying within or near one of his knee joints. Professor Colohan (of Queen's College) sent him to the assistant in the physical laboratory, a man named Haire, to have the joint skiagraphed, in order to perfect the diagnosis. The result was not satisfactory, and after some repetition a Roentgen ray burn appears to have developed. Ultimately the boy was sent to Dublin for advice and treatment, and the comments there made on the origin of the cutaneous sore led to the legal proceedings. There were three actions brought by the guardians of the boy—one against Dr. Colohan, one against the laboratory assistant, Haire, and one against the college authorities.

The trial lasted seven days; twelve K. C.'s were retained thruout; the most noted experts were summoned from the other side of the Irish channel, and those of Dublin were necessarily pressed to the front. The evidence of Dr. W. S. Haughton, the premier Roentgen ray specialist of Dublin, was the conspicuous expert feature of the whole trial. Every possible aspect and every practical property of the Roentgen rays, in their relationships with human tissues, were thoroly thrashed out in open court, and the most up-to-date Roentgen ray machinery was made to display its modes of action to the jury. After the brilliant display of native science and native wit, nobody was surprised that the Roentgen ray specialists carried the opinions of the jury, and that a verdict was recorded in favor of the defendants. The

result must have taught something to the lawyers, as well as to the general medical and lay public for the trial was one of the most expensive that has taken place in Dublin for a long period, and the plaintiffs do not appear to be persons of any substance.

**THE VERDICT.**—Judge Gibson's charge to the jury occupied about three hours, and at the close he submitted the following series of questions for their consideration. Their perusal will well repay attention. We subjoin thereto the answers which were given by the unanimous decision of the jurors, after a conference of one hour:

1. Were the Queen's College, Galway, and Haire, or one, or which of them, employed for reward to photograph by Roentgen rays in December, 1902, and in April, 1903? Haire was so employed. College was not.

2. Was the sore caused by the rays? Yes,

3. Were the rays negligently applied as regards:

(a) Distance? No.

(b) Duration of such exposure? No.

(c) Consecutive multiplication of exposures? No.

(d) The type of machine? No.

4. Was the sore caused by the operation

(a) Of December 15? Can not say which.

(b) Of December 26 and 27? Cannot say which.

(c) Aggravated by those in April? No.

5. (a) Did the operation of Dr. Colohan, for which Haire is not responsible, contribute to the sore? Yes.

(b) Did the operation of Haire, for which Dr. Colohan is not responsible, contribute to the sore? Yes.

6. (a) Was Haire negligent in applying the rays? No.

(b) Was Dr. Colohan negligent in applying or superintending? No.

7. Before the rays were applied in April was:

(a) Dr. Colohan negligent in not diagnosing the sore as caused by Roentgen rays? No.

(b) Was Haire so negligent? No.

8. (a) Was Dr. Colohan negligent in applying the rays in April after the sore appeared? No.

(b) Was Haire so negligent? No.

9. To what damage, if any, is the plaintiff entitled? None.

10. Is any, and what amount of such damages attributable to acts of Dr. Colohan only? Not answered.

(b) Is any, and what amount thereof attributable to acts of Haire only? Not answered.—*American Medicine.*

**X-Rays in Leukemia**—A dispatch from Turin dated July 11 states that Dr. Bozzoli, director of clinical medicine at the Turin University, has informed the Academy of Medicine that experiments he has made have shown that the x-rays have remarkable efficacy in some serious diseases of the blood. He says that he has cured by this means a supposedly incurable case of leukemia.—*Med. News.*

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